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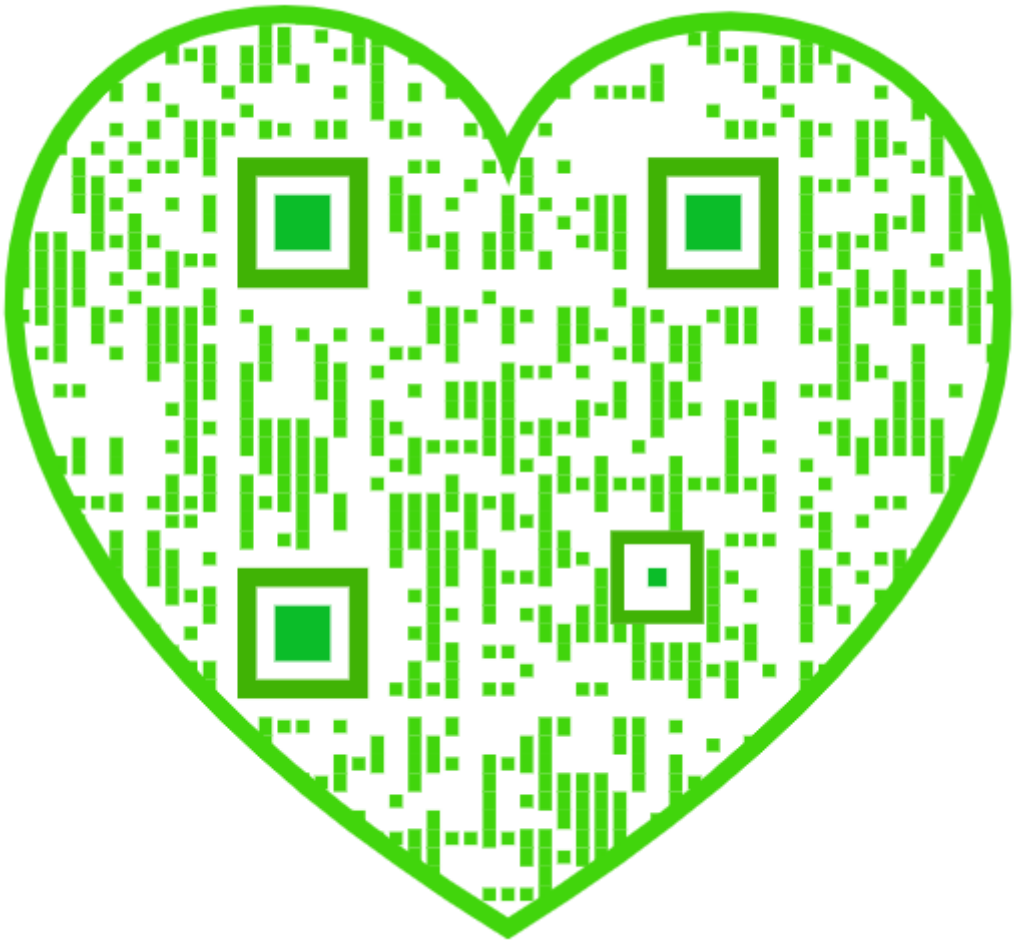

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STEAM PLOWING.

DESCRIPTION OF THE OPERATIONS

OF THE

WILLIAMSON

Road Steamer and Steam Plow,

ON THE

Seed Farm of Messrs. David Landreth & Son,

AT

BLOOMSDALE, NEAR BRISTOL, PA.,

ETC., ETC., ETC.

D. D. WILLIAMSON,

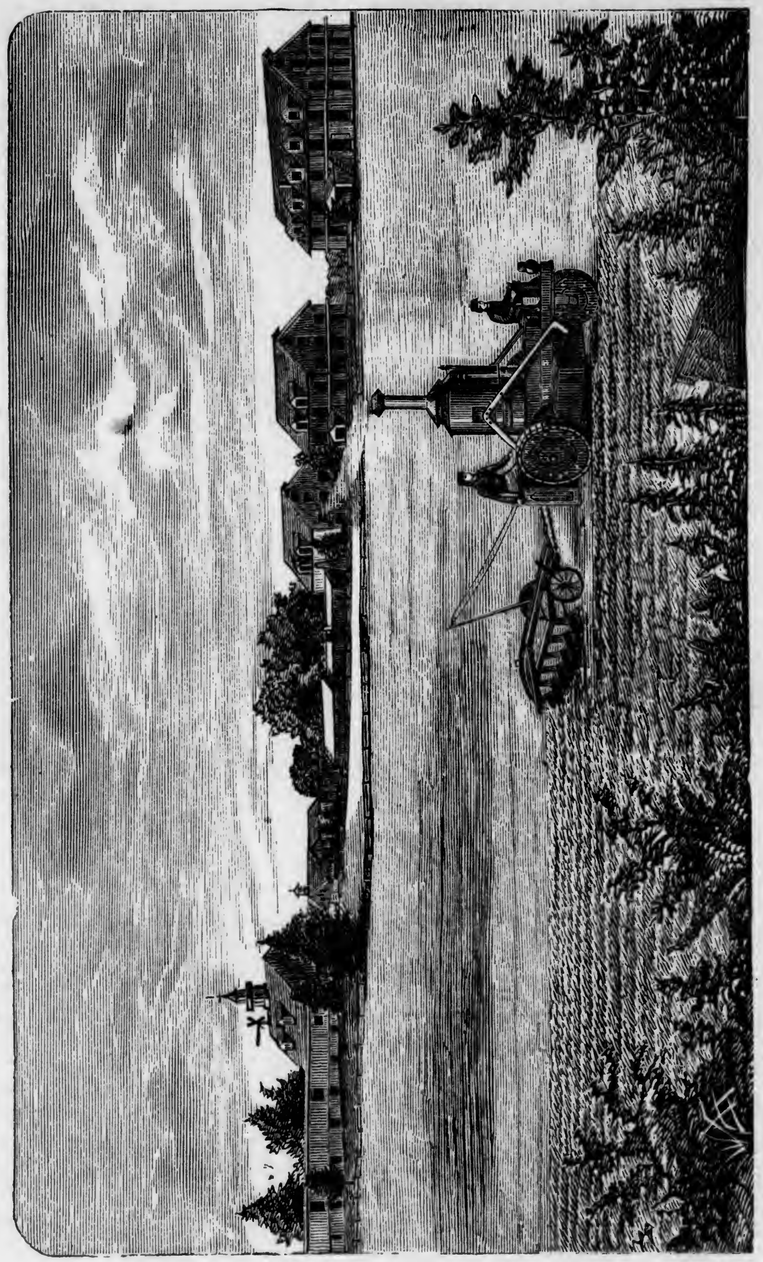
No. 32 Broadway.

New York:

McDonald Bros. & Dillont, Printers and Stationers,

No. 5 Park Place.

1873.



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D. D. WILLIAMSON,

No. 32 Broadway,

New York.

INTENTIONAL SECOND EXPOSURE

No. 32 Broadway,

New York, December, 1872.

The principal object of this Pamphlet is to present to those who are interested in the subject of Steam Cultivation, the opinions of a number of gentlemen well known as advanced agriculturists, who, having no interest whatever in the system employed, have printed simply what they saw, and the conclusions they formed after witnessing the operation of a Williamson Steam Plow at Bloomsdale. In the following pages will be found ALL that has been printed on these trials, whether favorable or otherwise. The opinion of a gentleman so widely and favorably known as David Landreth, Esq., formed after actually riding upon the Steam Plow day after day as it crossed his beautiful fields, and watching the thoroughness and celerity with which it worked, is alone of immense value to those who have been anxiously waiting for a Steam Plow adapted to American fields.

Another object in collecting and publishing these articles, is to distinctly connect the name of Landreth with the earliest *practical* working of Direct Traction Steam Plows in this country, as well as to perpetuate the remembrance of a most enjoyable day, when a gathering of notable men came to examine critically the Steam Plow, and to enjoy the bountiful hospitality of Bloomsdale.

That the English system of Rope Traction is considered as not adapted to this country is amply proved by the fact that the import duty on these Plows has been removed, and for the past two years they could be landed here at an advance of only about $250 to $300 on their cost in England, and yet none have been imported. Their best results have been published, and are well understood by our intelligent Farmers, but the conviction has ever been strong that the American Steam Plow must consist of a light, powerful steamer, drawing a gang of easily managed Plows behind it. Thanks to Mr. Thomson, of Scotland, his rubber-tired Road Steamer has given the cue from which, after successive improvements and radical alterations,

the Williamson Road Steamer has been perfected, and this motor, with the Williamson Gang Plow behind it, has now proved itself capable of plowing, with reasonable economy, all land in fair condition, which is adapted to Steam Cultivation.

The failures in plowing by direct traction in England have simply proved that their heavy rigid-tired Traction Engines and cumbersome Plows were entirely unsuited to the work. As well might an attempt be made to navigate our shallow rivers with their magnificent ocean steamers.

Nor are the Williamson Engines to be confounded with the Road Steamers built by the Licensees of Mr. Thomson, in Great Britain (of which about 150 have been constructed), as they are radically different in many points which are vital in Steam Plowing, and which are the result of much actual experience in the field.

In addition to the accounts of the Bloomsdale trials, there are added a few extracts from different newspapers, showing what the Williamson Steamers and Plows have been doing in other parts of the country.

Believing that the Steam Plow is to play an important part in the development of our country, the publishing of this Pamphlet may prove a not unimportant contribution to its history.

D. D. WILLIAMSON.

PLOWING BY STEAM.

TO THE EDITOR "PHILADELPHIA PRESS:"

THE numerous inquiries addressed us in respect to steam plowing by *direct traction*, as opposed to the more cumbrous and costly "double engine and rope system," induces us to request space for a few remarks, which may interest parties who desire information as to our experiments at Bloomsdale.

The engine used by us mainly, is the three-wheeled, rubber-tired, of Thomson, of Scotland, improved greatly by Williamson, of New York, the American patentee, and sole builder in this country: one with *four* wheels, the drivers being fitted with rubber tire, (also by the same party) has been experimented with, but the first named excited most

interest, and probably will be generally preferred; though the latter has some good points which are not to be overlooked.

In this communication, we shall confine ourselves, however, to the three-wheeled engine, the special advantages of which are fully set forth in various publications on the subject, to which the reader is referred.

Our experiments were commenced in August, of the present year, under the direction of an aid of Mr. Williamson, who though not a professional engineer, was quite an expert in mechanics; he proved to be ever ready to acknowledge minor defects as they were exhibited from time to time, and prompt in a desire to amend them.

At first some difficulty was found in steering the engine, so as to have each furrow-swarth regularly and uniformly lap the preceding, but a little practice overcame the inclination to vary from the proper line. The Williamson Plow is a gang of five or six plows (five being principally used), of steel, and are affixed to an oblique rigid beam, so inclined as to cause each furrow slice to fall into its proper place, and with levers so adjusted as to run the plows to the desired depth, say eight inches, as in our trials, though a shallower or deeper depth may be adopted at pleasure. Each plow turns a slice of fourteen inches, and when five only are used, the breadth simultaneously turned is nearly six feet. The speed usually exceeds that of mules or horses when engaged in plowing, and we have, without difficulty, accomplished an acre an hour. With greater experience and proper facilities for supplying fuel and water, there is little room to doubt eight acres a day, with full allowance for detentions and stoppages, may be set down as an average result. Indeed, we hope, with increased practice, and the more thorough removal of obstructions, to exceed that area.

It is not, however, from the plows that we look for the most important results, but from an implement, termed by the English a "breaker," which is simply a series of iron coulters or sub-soilers, so arranged on a frame as to cover a breadth of nine feet, which, as it offers less resistance than plows, moves with greater facility, and prepares many acres a day. This breaker is designed at one operation, to disintegrate and pulverize the surface soil, and also disturb the hard pan below—it may be months after it has been plowed—and with a harrow attachment used simultaneously,

leave the surface smooth and ready for seeding. Practical men can at once perceive the advantage of this process.

In our own culture, with five hundred or more acres to prepare for seeding, if possible betwixt the opening of spring and first of May ensuing, it may be difficult to estimate its value, especially as we propose to execute the plowing in autumn, and early winter—only using the breaker and harrow in spring to lighten up and further disintegrate the soil. Such, it is certain, may be a profitable practice in the preparation of oat and corn lands, and also emphatically so with the exhausted cotton lands of the South, allowing the plant as it were, to revel in fresh pastures; and with an imperfect knowledge of rice culture, obtained by casual observation, we do not hesitate to say, the Williamson Traction Engine and Breaker is destined to recover our almost abandoned interest in that crop. Not only will cropping be thus facilitated, but if the experience of our English brethren be confirmed here, of which there can be no doubt, enlarged products will attend the more thorough tillage which steam power may enable us to practice.

We do not purpose, on this occasion, to enter into details as to the relative cost of muscular, animal, and steam plowing, but we may say, that if with steam eight acres a day can be counted on as an average day's plowing, and twice that number with the breaker, there need be no question as to its economy on large plantations; nobody, it is presumed, imagines steam is adapted to the tillage of small farms, except through a system of co-operation among farmers.

It is hardly necessary to say that, in addition to plowing, the Williamson Steamer will be of great service in hauling farm produce and manure, threshing grain, sawing wood, grinding fertilizers, and in many similar employments, which the progressive farmer must adopt in self defence.

DAVID LANDRETH & SON.

Bloomsdale, near Philadelphia, December, 1872.

HAVING been fortunate enough to receive an invitation from the Messrs. Landreth to be one of a company of agriculturists called together at Bloomsdale, on the 8th of November, to witness the working of the Williamson Road and Field Engine, I am induced to make certain notes of that

remarkable exhibition of a new application of steam, and the reflections incited thereby.

The engine in question, is one made on a plan originally designed by Mr. Thomson, a Scottish civil engineer, but built and improved by D. D. Williamson, Esq., of 32 Broadway, New York, the American patentee and sole manufacturer in the United States. The complete engine weighs between six and seven tons when ready for work, and is capable of exerting a force of eighteen or twenty horse power. It is supported upon two large driving wheels, and upon a third and smaller wheel in front, used for steering. The total length of the engine is thirteen feet, and width under seven feet. The boiler is made of steel, and is an upright tubular, thirty-four inches in diameter, fixed between the driving wheels, which are five feet in diameter, and fourteen inches broad. In front of the boiler are two cylinders, six by ten inches, other machinery and steering gear, all in charge, and immediately under the eye of the engineer. Back of the boiler are the coal boxes, furnace, and platform for fireman, who is charged with the care of the plow or wagon train. The construction of the various parts of the engine is, although very perfect, not particularly remarkable, the novelty of the machine being in the number and arrangement of its wheels, and in their construction, which enables it to be turned in less space than that required for a carriage, and distributes its weight upon the ground over a broad surface.

The wheels of all successful self-propelling engines were, before the introduction of the Thomson wheel, and (excepting the one in question), are yet made with rigid iron tire, which necessitates the application of diggers upon the periphery, to give them sufficient grip on the ground to prevent slipping—these "diggers," although not so objectionable on the farm, are decidedly so on hard roads, as the works are injured by the continual jar, the machine walking, as it were, on stilts; and the road if good, is seriously cut up. (The Williamson wheel has also provision for "diggers," but they are seldom required.)

But the application by Mr. Thomson of a rubber tire four and a half inches thick, and twelve inches broad, not only overcomes this difficulty through its elasticity, but, by the weight of the engine, the rubber is flattened out as the wheels revolve, thus increasing the bearing surface upon the ground from less than one hundred square inches (as it would be with an inflexible tire), to six hundred square inches with the rubber.

It is in this increase of bearing-surface where the rubber-tired engine has its advantage over all others, and the advantage is two-fold—first, giving the machine such a tenacious grip upon the ground that it is propelled forward under circumstances when the wheels of an engine of smooth, rigid tires, would revolve without effect; and secondly, in distributing the weight to such an extent that the pressure per square inch is not greater than that of a horse's foot, as can readily be perceived by examining soft land over which it has passed.

These rubber tires are of vulcanized material, expressly prepared for this purpose, and have been thoroughly tested in Scotland, where numbers of engines are in use, the tires of which remain in a good state of preservation, after having passed over many thousands of miles.

The better way, however, to describe its wonderful capacity, is to state what we saw it do at Bloomsdale, the noted seed-farm of Messrs. D. Landreth & Son, near Philadelphia, (an estate of six hundred acres, as level as a prairie, and without an obstructing fence, ditch or tree; thus admirably adapting it to the use of just such a machine as we there saw in operation.)

The company there assembled, although they had all seen other traction and plowing engines at home and abroad, were amazed at the performances of this little steamer, and freely gave way to exclamations of delight as one after another of its powers were exhibited.

It first ran at a rate of eight or nine miles an hour, up and down a long wagon road, and then into a court-yard where it almost as readily pirouetted round and round, backward and forward, as freely as could an experienced performer on a velocipede. Then up and down, forward and backward, starting and stopping on a long embankment, leading to the upper floors of an elevated stone barn, and on which the grade was about one in five.

Then it was attached to two farm wagons, which, when filled with about thirty persons, it drew at a rate of six miles an hour, a distance of two miles, around a portion of the estate, over a stony turnpike, a sandy road, a clay head-land, twice up and over a railroad, up and down various grades, and through mud and mire, the rain having fallen in torrents the day before, rendering these tests all the more difficult.

Next it connected with a gang of plows, and drawing them to the field, entered upon its severest trial, but without hesitation.

The order was given to go forward, when away it went, turning with five large, steel plows, running seven inches deep, a swarth of six feet in breadth, of very stiff blue-grass sod, the growth of many years. Puff, puff, puff, went the engine, and if the company had followed it around the field as rapidly as it moved, they would have puffed as well, for it delayed not, but turning out as it successively arrived at the ends of the field, re-entered without stopping, and in less time than a minute, and so on continuously, until the company were fully assured of its almost fabulous power and capacity. We were told by Mr. Landreth, that it had repeatedly and consecutively turned with the plows, out and in at headlands, in thirty seconds, the width of headlands being twenty-four feet.

The practice at Bloomsdale, when preparing a field for steam plowing, is to mark out a headland eight yards in width at each end, and a strip of the same width on each side, and when the field is finished to plow around the belt, thus breaking up the entire area without difficulty.

Upon this occasion the plows reversed *five hundred cubic inches* of soil for every inch of forward movement, but we were told that the engine had drawn the plows quite readily when running twelve inches deep, then reversing *eight hundred and sixty cubic inches* for every inch of forward movement, although the difficulties of plowing increase in a greater ratio with an increase of depth than with an increase of width, which fact is not generally considered when making comparisons in plowing.

From my observations of the day, which were thorough and decisive, I conclude that the Williamson Steamer, as a roadster, is so rapid in its movements, so powerful in direct traction, so well adapted to driving machinery by means of belting, and in all situations so easily handled and so unlikely, fitted as it is with an improved spark-arrester, to fire buildings, even when placed immediately alongside of them, that it may be safely said there is scarcely a limit to its use.

On the farm to plow, to haul manure, to thrash, to saw wood, to grind corn, cut fodder and hay, and steam the mixture for stock-feeding, and perhaps, before long, to propel a mower and reaper over fifty acres a day.

In the stone quarry to lift and move ponderous blocks.

In the ship-yard to transport and raise mighty timbers.

On the canal to haul boats.

In the construction of railroads, to haul earth from the cuttings to the embankments, and distribute the ties and rails.

In transporting passengers and freight, in districts where there are no railroads, or as tributary to existing railroads. With suitable carriages attached, a steamer could run any distance, provided the surfaces were suitable, with thirty or forty passengers, and at a rate of seven miles an hour—thus developing and preparing a district for a line of rails.

On the wharves and docks, in loading and unloading vessels.

In raising the stones, iron, and lumber, used in the construction of buildings, and in a multitude of similar employments.

In most of our cities there would be employment for scores of engines, and these would probably be owned by companies who would have their employees in charge, and their agents looking after fresh work, so that no sooner would one job be finished, than the engine, with the rigging necessary for its work, could move off as rapidly as an ordinary wagon, to another field of labor, already designated. It may be asked, cannot any traction engine do all these various works on the farm, in the city, and on the common road—to this I say, no! The Williamson Engine alone being able to fill all the requirements, because of its peculiarly constructed wheels, giving it such wonderful power and facility of movement.

In the southern and western country there are hundreds of farmers who could on their own lands profitably own and employ a Williamson Steamer, but for those of fewer acres, and for the majority of farmers in the East, a system of co-operation in the purchase and management would be best.

They could have their lands plowed, lumber cut, grain thrashed, and corn shelled at such prices, and under such rules regulating the question of precedence, as they might adopt. The profits of the year to go into their own pockets—they themselves being stockholders.

The production of steam-tilled farms, it is probable, will greatly increase, as the land will be cheaply, promptly, and deeply plowed, thus facilitating the operation of seeding, and encouraging a more vigorous growth of plant. The farmer, not only enriched by an increased product per acre, but both he and the community benefitted by the saving of those *large*

quantities of grain and hay now annually consumed by the horses engaged in the very work to which the engine will be applied, it feeding on the production of the forest and mine.

The Royal Agricultural Society of England appointed last year a commission to decide upon the best managed *steam-tilled* farm, and one hundred and forty were deemed worthy of inspection. Upon these the reduction of horse-power under the new era varied from ten to twenty-five per cent., and was, in two cases, as much as sixty. This is all the more remarkable, when it is considered that the farm produce to be handled is an average of thirty-three per cent. over the old system.

When at Bloomsdale, the statement was made that the proprietors estimated the annual cost of horse-food at market-price (the food there being all purchased, not any produced), interest and depreciation on their stock at two hundred dollars per head.

In the South and West the value of stock, and cost of keeping, is less than half of that in the East, but supposing that one-half of the stock of horses and mules in eight of the Western States are engaged in the cultivation of the land, and on this making a reduction of eighteen per cent., which is proved to have been the average reduction in England, and estimating on this an annual saving of expense of fifty dollars a head for food, interest, and depreciation, we have a saving of thirty-five millions of dollars annually.

These items induce the thought that it would be interesting to work out a more accurate and reliable estimate of the gain that would accrue to the agricultural community, growing out of reduced stock in tillage, and the increased product, the result of steam cultivation, through even a partial adoption of this new system.

Before the successful adoption of steam plowing, however, our farms must be thrown into larger fields, and cleared of all unnecessary fences, headlands, trees, stumps and stones; and this very requisite clearing up and re-modelling will be of benefit, increasing the area of tillage-land, and more readily allowing deep culture, and, as a consequence, better drainage. And when it is considered that every additional inch of soil broken up and made productive below the ordinary depth of culture, gives one hundred tons in which plants can more fully develop and draw nourishment, it must be evident that deep breaking of the subsoil, will, under all circumstances, be

beneficial, especially on lands worn out on the surface, as are most of the acres of the older Southern States.

Fences are a great impediment to steam cultivation, and if it should serve to direct the attention of agriculturists to their almost entire unprofitableness (except to *fence in* stock, *not fence out* road cattle, as at present), and waste of land which they occasion, it will be doing another great work. It has been estimated that the first cost of all the fences in the State of New York was one hundred and fifty millions of dollars, and that the annual tax for fencing on each acre of improved land in the Union, is one and a half dollars. (Solon Robinson.)

As to the question of the economy of the Williamson Engine, as compared with horses or mules, a reasonably accurate conclusion can be reached by the following calculation: assuming that a pair of mules depreciate two-thirds in value in ten years, and that their original cost was four hundred dollars, that, at six per cent. simple interest for that time, added to the cost of food, stable-room, shoeing, and depreciation of harness, and drivers' wages, all at six per cent. simple interest, we have a daily expense of two dollars and eighty-one cents, and as the average of plowing is an acre a day, the same two dollars and eighty-one cents represents the cost per acre.

Now, taking the Williamson Steamer and its gang of plows, at a cost of five thousand dollars, and assuming the same depreciation of two-thirds on its original cost in ten years, and estimating that on the *farm* it will be employed one hundred and fifty days in the year (in many other situations the employment would be more constant, and therefore less costly), for a series of years, one finds by a calculation at simple interest for ten years on the first cost, added to cost of one hundred and and fifty days' work each year for ten years, for engineer at three dollars, fireman at two, cost of coal and cartage of water at five dollars, and wear and tear at ten per cent. per annum, all at six per cent. per annum for the ten years, and estimating the value of the engine then on hand to be one-third of the original cost, one has for the fifteen hundred working days within the ten years, a daily cost of eighteen dollars and thirty-six cents. Now, supposing the engine plows eight acres a day, we have a cost of two dollars and thirty cents per acre, as compared with two dollars and eighty-one cents by horse power, to say nothing of the superiority of the work. Or looking at it in another way, the daily cost of the engine only being that of six and a half pair of mules working in the field, while it does the work of eight pair.

A mere estimate in dollars and cents of the comparative cost per acre of plowing by horse and by steam power does not, however, show the advantages of the latter to its fullest extent. Even if the cost of plowing by steam was greater than by horse, it would, in the estimation of large operators, have the preference, as by the greater capacity of steam they would be enabled to push forward work, not stopping for heat or drought, and prepare land for seeding in due season, whilst others, dependent on animals, would lag behind.

On all occasions when the steamer would be employed as a stationary engine, the engineer would act as fireman, and frequently burn wood, the production of the farm, instead of coal, thus reducing the expense quite five dollars a day.

A set of Fowler's engines, with tackle, cannot be had for less than ten thousand dollars, and requires two engineers and four or five men to manage the ropes and implements, necessitating such an expense that it can only be profitable where the work is constant, and the fields very large, for, with the rope system, it takes an average of two hours to put down and take up on a field all the impediments of the English system, while, with the Williamson Direct Traction Plowing Engine, the time taken to move from field to field is only that which would be required to move a wagon, and when it arrives at a new field, is immediately ready to go to work. All the calculations that the writer has ever seen of the daily cost,or cost of plowing per acre by the rope system, have been very defective, the interest, and wear and tear, either entirely omitted, or else greatly deficient in amount, while one will always find charged the small items of oil and cotton waste.

The use of the steam plow will familiarize farmers with machinery which will have a benefitting influence, inducing in them a greater desire for improvement, and habits of thoughtfulness beyond the ordinary routine of their fathers, who, though they may have been good farmers in their generation, would cut a sorry figure in this age of reapers and mowers, and of steam and chemistry, as applied to agriculture.

Agriculture is indeed taking great strides; no farmer should work in the dark, though, alas! too many do; the less excuse

with the many botanists and vegetable physiologists, to tell us of the habits and structural development of plants, with the many chemists devoted to their science, as applied to agriculture, teaching the chemical organization of vegetable substances, and of the kinds of manure profitable to apply, and with manufacturers of fertilizers offering us articles of sworn composition, all which, with steam to prepare the ground, to harvest, and thrash the crops, dull must he be who fails to make progress.

Indeed, it seems that modern agriculture may become a science, not simply an art, for the personal attention to details, keen observation of the habits and formation of plants, and chemical and mechanical knowledge needed to carry on a successful system of farming will, ere long, rank in intricacy with the deepest of those studies called the "sciences."

A Bucks County Farmer.

November 15, 1872.

[Communicated to the "Maryland Farmer."]

REPORT OF TRIAL

OF

WILLIAMSON'S ROAD AND FIELD STEAMER.

Made on the 8th of November, 1872, at "Bloomsdale," the Country Seat and Seed Grounds of D. LANDRETH, Esq., of D. Landreth & Son, Philadelphia, Pa.

By J. Wilkinson, of Baltimore, Md.

The Messrs. Landreth having recently introduced the steam plow in the tillage of their six hundred acre seed grounds, with gratifying success, in their wonted generous spirit invited a number of friends to visit them and witness the working of this modern motor for plowing, hauling, etc., on the farm, among which friends the writer feels that he was fortunate in being included, as the occasion was most interesting. Though the day was propitious, fallow and stubble ground were entirely too wet for tillage, rain having fallen in torrents the day previous, but our host seemed determined we should not be disappointed in seeing the steam plow perform, so he ordered it into a favorite, long-standing pasture, which was a firm

sward, apparently kept exclusively as the home of a trio of beautiful Alderneys, part of the admirable Bloomsdale herd.

SIZE OF THE LOT.

The lot in which we were obliged to plow was rather short, it measuring only two hundred and fifty yards in the direction of the axis of the furrows, as in plowing by direct *traction*, much is gained by long "lands,"—the minimum should not be less than three hundred yards, but this field was favorable for testing the steam plow under such circumstances as might occur.

The engine turned out on the headland at each end of the lot, and set in again without stopping, only losing each turn, perhaps thirty seconds of time.

TWO ENGINES EXHIBITED.

Two self-propelling steamers were exhibited to the company, each being of American manufacture, and each having *rubber tires* on the driving wheels.

One a four-wheeled engine with "compensating gear," having but one cylinder, and a horizontal boiler, the power being nominally ten horse, but actually much greater. The general appearance of this steamer is similar to the English engines. It was made especially for farm work, such as plowing, thrashing, and hauling, and although powerful, and doubtless a very efficient engine, it appeared to be cumbrous and plethoric when compared with the second engine, to which our attention was especially directed. This latter is supported on three wheels, two, the drivers, sustaining nearly the entire weight of the engine—the third and smaller wheel being affixed in front, and used for steering, as is the front wheel of a velocipede.

The driving wheels are fifty-eight inches in height, and sixteen inches "face," the steering wheel thirty-four inches in height, and thirteen inches face.

THE DRIVING WHEELS.

The peculiar construction of the driving wheels gives them great superiority over all other wheels for traction engines, for which the world is indebted to Mr. Thomson, C. E. of Scotland, and to Mr Williamson, the manufacturer in this country, of these road and field engines, for valuable improvements.

The Thomson wheel resembles a huge hollow pulley of iron, yet light and strong, the dimensions the same as those above described; its periphery being perforated with half inch holes. Surrounding this perforated iron tire is a continuous band or tire, of vulcanized rubber, four inches in thickness, and sixteen inches in width. Outside of this is an endless chain, formed of steel plates, each plate being four inches in width, and of a length to extend across the face of the rubber tire.

THE EFFICIENCY OF THE WHEELS.

The practical working of the device is *perfect;* the wheel, as it revolves, flattens out at its bearing, by the weight of the engine on the elastic tire, thus greatly increasing its traction. Portions of the inner side of the rubber tire, when compressed, protrude into the perforated face of the iron wheel, to which it firmly connects itself, and the endless chain of plates adapts itself to the ever changing outer surface of the rubber tire, which it protects from injury, and the elastic tire, when compressed, gives a bearing surface of over six hundred square inches under the three wheels, and actually exerts a pressure not greater upon each square inch covered than does the foot of a horse.

The efficiency of this traction wheel, a truly wonderful invention, is attributable to the distribution of the weight, and increased impact upon the surface on which it revolves.

The American manufacturer has made a decided improvement upon the Scotch wheel, above described.

It consists in substituting short segmental lags, or blocks of rubber, for the expensive continuous tire, or band of this material, and by fitting the wheel to receive "diggers," so as to prevent miring in swampy land, at the same time retaining the principle of compressibility, so invaluable in a traction wheel.

THE FORM AND DIMENSIONS OF THE WILLIAMSON ENGINE.

Mounted upon three wheels is an upright steel boiler, the height of which, with the smoke stack, is but ten feet from the ground.

In front are two horizontal cylinders, each six by ten inches, with the works, water-tanks, seat and steering apparatus for the engineer, who is pilot as well.

Back of the boiler are coal bunkers, and platform for fireman, who also acts as superintendent of the plows. The tank holds water for two hours' supply, and the bunkers coal for four hours, and, with the operators on board, the engine weighs a little over six tons.

COAL CONSUMPTION.

The coal consumed per diem averages about three quarters of a ton (bituminous), and of water about five tons; this amount will, however, be greatly reduced by an improvement in progress.

The nominal power of the engine is eight horse, but it is capable of exerting nearly three times that power.

DIMENSIONS.

The length of the engine is thirteen feet, the width six and three quarter feet.

THE PLOW.

The plowing apparatus consists of a frame, with a gang of five to eight plows attached; each so arranged or set as to cast its furrow into that of the plow preceding it.

The width of the belt plowed of the sward, which I witnessed, was about six feet, and seven to eight inches in depth, though the power of the engine was evidently capable of plowing a much greater width and depth, as it has plowed at Bloomsdale, seven feet in width, and ten inches in depth.

SPEED.

The speed with which the plow advanced was about double that usually made by mules or horses in plowing.

The soil was nearly free from stones and rocks, and was thoroughly plowed. All present pronounced the steamer and steam plowing emphatically a success.

TEST AS A ROAD ENGINE.

Prior to the exhibition of the engine in plowing, the engineer plied it several times up and down a farm lane, and ran it up among buildings, where the turns must necessarily be short, and be made with precision; he also exhibited various velocipedian performances with admirable skill, and satisfied all that the ponderous iron horse could turn much quicker, and on a less area than would be required to turn a pair of horses attached to a farm wagon; or, to be more explicit, it can

be turned completely around in a circle of eighteen feet diameter, as either of the driving wheels can be made to serve as a pivot.

This engine can be run readily on a common road up to ten miles an hour. The elastic tire serves as springs, and relieves the engine from the injurious effects of concussion.

One of the most remarkable performances of the steamer was to run up and down, forward and backward, stopping and starting at pleasure, on a hill having a gradient of one in five.

PERFORMANCE ON A ROAD IN HAULING A TRAIN OF WAGONS.

Next in order, two large farm wagons were attached behind the steamer, each fitted up with loose seat boards across the body, and as many as could ride were seated, when she steamed out on the public road, passing obstructions and avoiding gate posts in admirable style.

When once in line on the road, not unlike the spirited trotter when he strikes the track, our iron horse seemed suddenly excited, and went as though a whole lot of "old boys" were after him. Fortunately, the road was a fair one, with here and there a stone, sufficient to give us a good shaking.

We sped away a circuit of some two or three miles, and returned to the starting point, by entering the domain on the opposite side from that at which we left it, and crossed by farm roads, through an area of fifty acres or more, which had recently been plowed by the engine. The work appeared to have been executed in a superior manner, with a uniform depth of nine inches.

We next witnessed with intense interest the plowing of the sward, of which I have spoken, which was continued until the novelty was slightly waning, when we were informed that *dinner* was next in order. No announcement on the programme seemed to be more popular, so all marched in the direction of the large national flag, which waved over the mansion, hidden for the moment from our view by the stately, venerable trees that surround it.

During the evening many subjects of general interest were discussed. D. D. Williamson, Esq., of 32 Broadw New York, who is the sole manufacturer in the United States of road and field steamers, with Williamson and Thomson's patent wheels, instructively related the history and the many advantages of the steamer.

The discussion of the construction of wagon roads occupied a considerable length of time, though not a moment more than, on account of its importance, it deserved.

The exemplification of the efficiency of the Williamson Engine as a roadster, for hauling both passengers and freight over common roads, especially now when we are laboring under such inconveniences occasioned by the epidemic among horses and mules, made the discussion of its merits a matter of intense interest.

The founding of towns and cities, the construction of dwellings, sources of water supply, landscape gardening, forestry, pisciculture, fertilizers, etc., each shared our consideration. There seemed to be a general concurrence of opinion on all topics discussed, and nothing occurred during the day to mar our social pleasures.

Had I space, a description somewhat in detail of Bloomsdale, the system of cropping, the implements and machinery used in cultivating, harvesting, and preparing for market the great variety of vegetable and flower seeds there grown, would be of interest. Suffice it to say that fifty-eight head of horses, mules, and oxen, are used on the farm, and its dependencies, and four steam engines, beside the Williamson Road and Field Traction Engine about to be permanently added; twenty-five thousand dollars worth of fertilizers are annually applied, in addition to the manure made on the farm, and every variety of implement and machine used in agriculture and horticulture in this country, may there be found, and what we saw there were sufficient to stock a respectable warehouse.

Everything is in order, and system, neatness, good taste and fitness of things, pervade the entire establishment.

The *seeds* grown at Bloomsdale, and on other lands owned, occupied, and operated by Messrs. Landreth, are exported to the shores of the Pacific, to Australia, and the British Possessions in India; in fine, their seeds are said to be almost as well known on the shores of the Ganges, as on the Mississippi, or Ohio.

[From "The Practical Farmer," Philadelphia, December, 1872.]

INAUGURATION OF A NEW ERA IN AGRICULTURE.

Steam Power on the Farm and Common Roads.

On the 8th of last month, in company with a number of other invited guests, we were present at Bloomsdale, near

Bristol, Pennsylvania, the residence and well-known seed farm of David Landreth, containing over five hundred acres, to witness the trial of a newly invented steam power, called the Williamson Road and Field Steamer. The inventor, D. D. Williamson, was present, and the steamer, which bears his name, is an American improvement upon the well-known Thomson Road Steamer, as constructed in Great Britain, and is now believed to be, with these improvements, perfectly adapted to road and farm service in this country. The American invention, which has overcome all previous difficulties, consists mainly in the use of a peculiar india-rubber tire.

We had an illustration in the *Practical Farmer*, of 1871, of this steamer, as she appears when hauling loaded wagons on our common roads. It is a traction engine, differing essentially from English steam plows, where two stationary engines are used, and plows are drawn from one side to the other by a series of endless chain ropes or wires. Two steamers on this occasion were shown us, in full operation, one having the continuous rubber tire, and the other having the tire in sectional blocks.

The first engine exhibited was on four wheels, and fitted with elastic tires, formed of sections of vulcanized rubber, and partially shod with steel plates, which latter secured the rubber, and in turn were secured by the wheel in an ingenious manner—which is D. D. Williamson's latest invention. The weight of the engine so compressed these tires that an elastic cushion of nearly three hundred square inches was interposed between each driving-wheel of the engine and the ground, thereby enabling the steamer to cross soft fields without sinking, and consequently without compressing the soil. An ingenious compensating gear enabled the steamer to turn in very small space, without slipping the wheels.

The second steamer was mounted on three wheels, and was fitted with elastic tire, composed of an immense ring of rubber, vulcanized in one piece. This was protected by a chain armor of steel plates, linked together at the sides, and conforming in their movements to every position of the wheels. This steamer could be turned in its own length, and moved itself about like a thing of life. No team of horses could have turned, backed, and stopped, with more facility and certainty. It was run up the steep bridgeway of a barn, having an elevation of one foot in five, backed down, and run up again with the greatest ease and facility. For a further confirmation of its capacity, a

couple of large farm wagons were coupled behind it, in which about twenty of the guests were seated, for a ride. It trotted off with us, on the public road towards Bristol, at the rate of six to seven miles per hour, went through gates, turned in at bars, crossed soft gullies, went up sharp hillocks, crossed at a sharp elevation the railroad track, and down again on the other side, and making a short turn, brought us back through a field of fifty acres, which had been plowed with it, to the place of departure. This plowing was beautifully done, and we were informed at an average depth of nine inches, much of it being plowed twelve inches deep. No more accurate or level furrows, as it appeared to us, could be made by any plowman with a well-trained team of horses. Two of D. Landreth's sons accompanied the *excursion party*, and pointed out the plowing in different places, performed by the steamer.

After being uncoupled from the wagons, it was attached for a trial of plowing to the Williamson Gang Plow, consisting of five plows, secured to one frame. This latter so light, strong, and handy, is the result of three years' hard work, much patience and expense. It is made to contain six hard steel plows, each cutting a furrow twelve inches wide, and, as D. Landreth informed the company, had on one occasion plowed fourteen inches deep. The ordinary depth the steam plow has been worked at Bloomsdale is eight inches. On the way to the field the plows followed the steamer as readily as a two-wheeled cart. Not a moment was lost in getting to work. The field selected was an old tough sod, with a steep grade in the centre. The tripping of a lever by the fireman, which he performed from his station at the boiler, let the plows into the ground, and away rolled the steamer as straight as an arrow, with the tough sod furrows rolling over behind, like so many waves. The work seemed perfect, each furrow being mechanically correct, and alike in width and depth. At the ascent of the grade in the middle of the field, no diminished speed was observable, the power seeming so arbitrary and irresistible, that no ordinary field obstructions could have resisted its continuous progress. Arrived at the end of the field, the fireman pulled another rope, and out shot each one of the plows, the steamer spun around on one wheel, ran across the headland, and turning into a new land, was instantly at work on the return '*bout*.' There was no hitch, no slipping or backing, but a simple, silent triumph of good, sensible engineering.

We are thus particular in describing exactly what we saw,

and was witnessed with surprise and pleasure by the whole company—because it *demonstrated* that the experiment of steam on the farm and on the road was successful in every point. Coming at a time when the farming business is unprofitable, and requires reconstruction, this new invention will greatly supersede in some sections the labor of men and horses, will make more thorough plowing and tillage, and will increase profits, by economizing time and labor. On a large farm of five hundred acres, like D. Landreth's, where there are no inside fences, it must be an invaluable addition to the working force. The system pursued at Bloomsdale is one of high farming, the land being *kept* in good heart, and ready to return sixty or a hundred fold, or whatever else is asked of it. The rapidly removing one crop and speedy putting in another, so as to secure the whole growing season, is an important operation, which can be easily performed by the Williamson Steamer, but is slow and expensive by single teams of horses. On our small farms around Philadelphia, clogged up with superfluous fencing, it is not expected or at all probable that single farmers will buy one of these steamers ; but they transport themselves, and may be purchased by individuals, who will go around a neighborhood, as now, with horse-powers, and perform thrashing, ploughing, and various other farm work, at a rapid and cheap rate. The heavy demand will doubtless be from the West, where furrows are plowed many miles long. They would also do admirably in the State of Delaware, where farms are larger than here.

At the conclusion of a most bountiful dinner repast, D. D. Williamson of New York, the inventor, by invitation, gave a brief history of his steam plow, claiming for it not the extravagant powers which enthusiasts were wont to demand for their inventions, but that with good management, on ground suited to steam cultivation, it would plow from one to three acres per hour, according to depth of the furrow, and length of the land. The cost of steamer and plow complete, is $5,000, as against $10,000, the cost of the cumbrous English system. The consumption of coal is about one ton per day in both systems. In addition to the wages of an engineer and fireman, the American machine requires only a boy to drive a water cart, while the British tackle employs five to six persons. The acreage plowed is about the same in both systems.

The Williamson Steamer is fitted so as to drive thrashing or other machines, and will haul from twenty to thirty tons of

freight in wagons, on any fair country road, in good condition. As regards compression of the soil in passing over, D. Landreth has carefully examined this point, and has found that owing to these elastic wheels, no injury or undue compression is effected. We consider great credit is due to him and his sons, for thus inaugurating the use of steam power on the farm and common road, and demonstrating by practical experiments on the field of Bloomsdale, its adaptation to the uses of the American farmer.

[From the "Germantown Telegraph," Philadelphia, November, 20, 1872.]

STEAM PLOWING AT BLOOMSDALE.

The trial of the Williamson Locomotive for road and field purposes came off at the splendid estate of the Messrs. Landreth, on Friday the 8th, instead of Thursday the 7th, the day being changed on account of the weather. We have several printed reports and communications of the trial, being unavoidably absent ourselves on this interesting occasion. We have, however, witnessed several similar trials of plowing by steam, the first being somewhere about twelve years ago. Still, we should have been pleased to witness this trial, which was more complete and varied than the others. Traction steam-power in plowing is by no means new, either in this country or in Europe, especially in England ; but it has been somewhat supplanted by the anchor-power, stationed at the headlands, which we have so often referred to in these columns.

The Williamson-Thompson Locomotive, as it is called, from being the joint product of these two gentlemen, the former an American, and the latter, we believe, a Scotchman, possesses several peculiarities in its construction with a view to contract the size, yet retain its power, and enable it to be easily handled and turned, not to be found in the others, which are of considerable importance to its permanent working. In the wheels, especially, there are many decided improvements, the principal ones being the use of India-rubber in sections, which, forming the rims, cause the weight of the engine to pass over the ground evenly. Much of the machinery is concealed, and is somewhat complicated, but not liable to get out of order.

It was first used as a road motor, drawing two farm wagons, loaded with interested spectators, on the public highways, crossing a railroad, ascending considerable elevations, and turning around in a common lane. About two miles were thus traversed, but there were other experiments indulged in, such as running up the carriage-way to the barn, stopping half way, and starting up again, etc. These showed that the locomotive possessed the power to overcome ascents. It was also run over a plowed field, through puddles of water, etc., the construction of the wheels preventing undue sinking. All these excellent features in this locomotive, we have over and over read of in the previous trials of it, and had no doubt then that they were correct as they are now proven to be. In fact we saw one of the locomotives last week on our way to New York, used as a *rival to the horse railways*, in carrying passengers. This, if we remember rightly, was at Elizabeth.

Its qualities, however, as a power for plowing on fields, are the most important part of the present consideration. That it exhibited these qualities in an eminently satisfactory degree is the assurance of every gentleman present who has communicated with us on the subject. We had ourselves no apprehension of this before the trial took place, and we so distinctly said some two months ago, on learning that the Messrs. Landreth had procured one of the Williamson Engines. The question of traction steam plowing has long been settled, but there is another question which has not been, which we shall briefly refer to presently. As to the plowing done at Bloomsdale, it was well done, and as perfectly as by hand-plowing. Five plows, cutting furrows seven inches deep and ten inches wide, at the rate of about one acre per hour, worked admirably ; the engine was turned easily and quickly, but not so rapidly as horses are—we beg to differ from some—which scarcely occupies half a minute ; but so quickly as to be a matter of wonder. A statement made on the occasion that *three* acres an hour can be accomplished, is of course unworthy of a thought. In ground like that of the great seed farm at Bloomsdale—almost level, a sandy root loam, constantly worked and manured, without a stump, a roat, or a stone—a steam plow revels in a paradise, and can doubtless be used there, not only to perfection, but with profit ; with profit, because it is hardly a question there of dollars and cents to get the work done in the nick of time, when the weather is favorable, and the crops ought to be in.

In England, the average work of a steam plow per day is from eight to ten acres—that is where steam plows are used, and their use is far more limited there than is commonly believed. Here the work of the Williamson will be about the same, but say the highest number, ten acres. In support of this we quote the following from a private note of Mr. Landreth, senior, who is one of our life long and best beloved friends, and we take the liberty of doing so because what he says is of public interest, and can be perfectly relied on :

"I *think* we have solved at Bloomsdale the problem of plowing by direct traction, so far as light, level, friable land is concerned. I speak only of such—beyond that our experience does not extend, and I desire not to mislead others. We can readily plow an acre an hour, and while I write these lines I have within sight the Wiliamson-Thomson Engine, with five plows attached, turning over a pretty stiff sod at that rate, and running as steadily as did in olden times the Conestoga wagon."

But the main point for consideration, after all, is that of ECONOMY. Of this nothing is said, and indeed nothing need be said, so far as it refers to the employment of this power by the Messrs. Landreth. As a point for the general farmer, however, or even of the most extensive farmers of the West and South-west, it is one of controlling importance. So far the economical question has been the death blow of former steam traction plows, and until that is settled satisfactorily, and on the right side of the balance sheet, steam as a motor for plowing will be restricted to particular cases.

[FROM GEORGE BLIGHT, ESQ., A WELL-KNOWN AND PRACTICAL FARMER IN PENNSYLVANIA, NOVEMBER 20, 1872.]

PLOWING BY STEAM.

ON the invitation of Mr. David Landreth, a number of gentlemen assembled at Bloomsdale, near Bristol, Pennsylvania, to witness an exhibition of plowing by steam. Those present were deeply interested in agriculture, and the application of steam to the cultivation of the soil. They had heretofore seen the performances of other plows in the vicinity of Philadelphia,

and while they sympathized with the inventors, they felt that much more was to be done before any practical results would be obtained.

On this occasion Mr. Williamson exhibited a "steamer," capable of performing not only the plowing, but the heavy hauling of the farm. Two hay wagons were attached, and the visitors were taken over the large estate of Mr. Landreth, and then on the main road, travelling at the rate of about seven miles per hour.

The plowing was equally successful. A thorough trial was given on that day, and also during the past month, some fifty acres having been turned over at the rate of one acre per hour.

Your correspondent will attempt no description of the plow—his part is simply to chronicle its success. All present were unanimous in their approval of the work done, and rejoiced in this new era in the progress of agriculture.

[From the "Germantown Daily Chronicle," Philadelphia, November 11, 1872.]

STEAM TRACTION.

Williamson's Road and Field Steamers—A Successful Trial at Bloomsdale.

It is a happy coincidence, that while we are threatened with the loss of our horse-power, a patriotic gentleman has applied his large means and talents to the application of steam as a motive and traction power for the road and plow. The English have employed an inferior invention for some time; as long ago as 1854 there were, in Great Britain, nine hundred steam plows, which were moved about from farm to farm in some cases, while in others, individuals are possessed of sufficient land to own one of their own. The names of Fowler and Howard are farmhold words in England. In this country, where the land to be cultivated is often less level and free from obstruction, this mode of breaking up the ground has not been till now a great success. The expense of a machine, and the education to work it, have been obstacles; but if the experiment at Bloomsdale, on Friday last, may be deemed a success, as we sincerely think it may, a most important

labor saving machine has been introduced. Bloomsdale, however, is somewhat exceptionally a convenient and level spot for the trial, with six hundred acres, and no fencing, except the boundaries.

A number of gentlemen assembled by invitation at Mr. Landreth's seed farm, near Bristol, Pennsylvania, and were invited to see the monster plow. Steam was up, and the engine exhibited to great advantage as a roadster. It turns in as short a radius as the most modern carriage, runs up an incline with great ease, and is under complete control by the management of two men. It was attached to two hay wagons, in which twenty-four men took seats, and were conveyed on an excursion over the large premises. At one time it swept through an open gate, bringing its attaches through with great accuracy. A locomotive, with a train from New York, came along, when the passengers, seeing the stranger waiting to cross the track, which it soon did, and ran up the incline to the road, cheered the invention vociferously. The party expressed themselves greatly pleased with the excursion, and no less with the beauty and order of the seed-growing.

The new traction engine was quickly harnessed to a huge plow, and taken to a five acre lot in deep sod, that had not been broken up for years.

It rapidly went to work, turning up five deep furrows with the greatest ease, and was pronounced by all a triumph. It is capable of plowing one acre per hour, as much as a usual day's work with horses, and may thus get through in a perfect manner, ten to twelve acres in a working day. The Thomson patent wheel, greatly improved by Williamson, ingeniously constructed so as to give a long impact or touch to the earth, is the great secret of this invention. The india-rubber is made into the form of cans for fruit, with strips for a guard, and the weight of the machine rests upon these, they give way slightly, and the greater contact impringes on the earth or sod sufficiently to gain traction power. There is no injurious compression of the soil, the great bearing surface of the rubber tires distributing the weight of the steamer so as not to exceed the pressure of the hoof of an ordinary horse. The steamer steers perfectly well, and can turn at the end of the field as quickly, and in as little space as horses. Fly wheel and governor are attached, with which to drive thrashing machines, cotton gins, or other stationary machinery. The engine used was the eight horse (nominal) road

steamer; the plows are of the best steel, and are arranged to plow from one to nine inches deep. A gang of six breaking plows, each cutting fourteen inches wide, costs, with steamer and stationary gear complete, $5,500 net, and will break, if required, even two acres per hour of running time, with the ground in good condition. With a rigid beam it will plow eight inches deep, at the same rate of speed and cost as above. In some sections a seeder and harrow can be attached, and thus complete the field work in one operation. No additional help is required in plowing, beyond that of the engineer and fireman, as the latter also attends to the plows.

With heavy work a consumption of three pounds of soft coal is required, the extremes being from two to four pounds of coal per mile for each ton of gross load on common roads. The consumption of water will be about seven pounds (three and a half quarts) for each pound of coal consumed. Thus an eight horse power road steamer, weighing six tons, drawing a load of eighteen tons, making a total weight to be moved of twenty-four tons, will consume seventy-two pounds of coal per mile on good level roads; say half a ton of coal per day's work of ten hours. The machine has bunkers for a day's supply of coal, and tanks for one-third of a day's supply of water.

We have been thus particular in noticing this labor saving apparatus, because it is likely at no future day, and with probably other improvements and simplifications, to be one of the farmer's cherished labor saving applications of ingenuity, thought and skill. It will not have the rapid introduction that the reaper had, and probably will be owned by parties who will take it round and plow for a neighborhood, at a given sum per acre. It works so rapidly that it will acommodate a number of farmers at the season when most required, and all know the great advantage of breaking up the ground in the fall season, and leaving it to the nourishment and disintegration of winter frosts. A good business may be created by a moderate expenditure.

We cannot close our brief notice without a word on the great Landreth seed farm. In extent and importance it has no rival at home or abroad; it is managed with business tact of a high order, and with experience that it has taken at least fifty years to perfect. The kindness and liberality of the owner are nowhere exceeded. In short, Bloomsdale seed farm is a model of completeness and usefulness beyond praise.

No English gentleman can be more justly proud of his acres than Mr. Landreth, and in the useful employment of his talents and money, we know no one to be more envied. One would suppose twenty acres would raise all the seeds required, but here are six hundred, and the product is carried to the East and West Indies, and even to Europe, and there is never an overplus.

[From the "Bucks County Intelligencer," November 12, 1872.]

TRIAL OF A STEAM PLOW.

An Interesting Day at Bloomsdale.

The application of steam to agricultural purposes, especially to the work of plowing, has hitherto received much less attention in the United States than in Europe. On the farms in England some three thousand steam plows are in operation, while in this country, with its great facilities for using them, particularly on the great plains of the west, there are probably less than a dozen of these implements employed. This is doubtless in a measure owing to the great cost of those in use in Great Britain, which, up to a recent period, have been the only kind of steam apparatus adapted to this branch of farming. Plowing by steam in England, as is known by those whose attention has been directed to the subject, is done by a stationary engine, placed on the side of the field, by which the plows are operated, by using long wire ropes. At first, only one engine was used, but it was soon found necessary to have two, stationed on opposite sides of the field, the plows to be run by a complication of machinery, and the wire ropes already mentioned. This method was so far from satisfactory, that the inventive powers of those interested in the matter were set to work to devise a plan by which a steamer could be constructed that, instead of remaining at a fixed point, could be moved across the field, drawing the plow after it. To accomplish this the main object was to construct wheels on which to run the engine, of such a character that they would adhere to the ground sufficiently, and at the same time not sink much below the surface. This much desired end, it is believed, has been achieved by the employment of india-rub-

ber in making the rims of the wheels. It remained for an American inventor, D. D. Williamson, of New York, to make a practical application of this discovery in the shape of a steamer for plowing in the manner last described, and for which he has obtained a patent. About two months ago David Landreth & Son, proprietors of the great seed farm at Bloomsdale, near Bristol, had two of Mr. Williamson's Steamers brought to their place, for the purpose of testing them. The Messrs. Landreth are well known as liberal patrons of every improvement calculated to advance the interests of agriculture, and they have therefore exerted themselves very diligently in testing the merits and capacity of Mr. Williamson's invention, not only for their own and the inventor's satisfaction and advantage, but for the benefit of the farming interests in the country generally. They have plowed about fifty acres of ground upon their farm with these machines, and so well were they satisfied with them, that it was decided to give a more public exhibition of their operation.

Accordingly, on Friday last, by invitation of the Messrs. Landreth, a number of prominent persons interested in agricultural progress, from Philadelphia, Baltimore, New York, Boston, and other places, assembled at Bloomsdale, for the purpose of examining the workings of this great invention, which seems destined to bring about a revolution in farming in the United States. The company, including many persons who had never visited Bloomsdale before, spent some time in inspecting the buildings, and other objects of interest about the premises, and then gathered to examine the steamer, which was fired up, and in order for use. The general construction of the steamer is similar to that of ordinary portable engines, the chief points of distinction being the style of the wheels, and additional apparatus for turning them around. One of them has four wheels, the two in front, which are used to guide the steamer, being much narrower and smaller than the two hind ones, the rims of which are about eighteen inches in width. The front wheels, upon which there is a much lighter weight, are only half that size. Between the inner and outer surfaces of the rims of the wheels are placed a series of sections or blocks of india-rubber, four inches in thickness, through which metallic bolts are easily passed. These run through a series of iron plates, three inches wide, and an inch in thickness, which are placed a short distance apart, and

form the outside surface or tire. By this arrangement the weight of the engine compresses the india-rubber, a large surface of the wheel comes in contact with the ground, the weight of the machine is distributed over a much larger portion of the ground than it can be by any other known means, and the pressure at any point, therefore, does not much exceed that produced by the hoof of an average horse. The other is a three wheeled steamer, the guide wheel being immediately in front. Another, and the principal point of distinction between it and the other is, that the india-rubber used in the construction of the wheels, instead of being in sections, is a continuous band around the wheel. Mr. Williamson does not think this as good a plan as to have it in sections.

The visitors were first shown the locomotive powers of the steamers. They are perfectly manageable, even in the hands of engineers of limited experience. They can be readily and quickly stopped, either on the level or in ascending a hill. By an ingenious attachment one wheel is made to stand still, while the other moves, so that they can be turned around with perfect ease. Their forward movement is readily checked, and they can be backed with facility. Their movements in this particular excited universal admiration. The next step in the programme was to exhibit their adaptation to the purposes of hauling or carriage over our common wagon roads. For this purpose a train, consisting of two heavy farm wagons, was rigged up. These were provided with seats, and the train was attached to the rear of the engine. The seats were soon filled with a portion of the company, and when all were ready the signal was given, and the train moved off. Starting at the center of the farm, near the buildings, it passed through an ordinary wagon-way, out to the turnpike, over ground both hard and yielding, and surface rough, as well as even, up hill and down, the engine puffing and snorting along to the astonishment of the people, who ran from their houses, and from their work in the fields, to gaze at the novel spectacle. Leaving the turnpike at the road bounding the Bloomsdale farms on the east, the procession passed on northward, in the direction of the Philadelphia and Trenton Railroad, which was approached just as an express train passed by. The passengers caught sight of the formidable train, and from joy at having escaped being demolished by it, or from delight at the dawn of the new era in the age of steam, the windows flew open,

and hats and handkerchiefs came forth in large numbers, which salute was returned by the Bloomsdale party, who, by this time, were in ecstacies over the success of this new experiment in railroading. The train now crossed the railroad, up a steep embankment, and passing around about half of the farm, turning several corners, through narrow passages successfully, going over ground in many places decidedly yielding, from the effects of recent rains, returned at last to the place of starting safe and sound. The distance travelled was over two miles, and the rate of speed about six miles an hour. Those who enjoyed that ride will not soon forget their first experience at railroading, under the new dispensation.

The next and most important part of the exhibition was the plow trial. This test was made under somewhat unfavorable circumstances. Owing to the heavy rains during the middle of the week, the grounds on the farm were too wet for a fair test of the machine. It was, however, decided to make the trial in a piece of sod ground, although the plow was not rigged for that purpose, having no coulters attached. The one that was used on the occasion consists of a series of six plows. These plows are made of steel, and are attached to a heavy wooden beam, to which two shafts are affixed. The beam runs obliquely with the shafts, by which the plows, when in motion, just precede each other in turning up the earth. On this trial it was thought best to take off one of the plows, and use but five. The plows can be run any desired depth, from six to ten inches, this being regulated by quadrants attached to the frame. When all was ready, the frame work of the plow was attached to the rear of the steamer, by a heavy chain, and the machine, under the charge of the engineer and fireman, was put in motion. The ground chosen for the trial was covered with a rather stiff sod, but the soil was deep and loose below, and with all the variety of surface for a thorough test of plowing, both on the level, and up and down hill. The plows entered the ground promptly at the bidding of the fireman, who, in addition to his other duty, had charge of the apparatus for this purpose, as well as for lifting them out of the ground at the other end. It plowed a uniform depth of about seven inches, each furrow being turned over as nicely as if done by an experienced plowman, in the usual way. At the end, the plows were taken from the ground quickly and easily, and the turning of the steamer

and plows to enter fresh furrows on the other side of the enclosure, was done as speedily, and with as much facility, as with an ordinary pair of horses. The plow was run at different degrees of speed, from that of a common plow team, to double that rate. By increasing the rate of speed, the ground is pretty thoroughly torn to pieces, and we should think that were it sufficiently dry, and in good order, it would not need much harrowing afterwards. Each plow makes a furrow a little over a foot in width, the whole five at a sweep plowing a space of six feet. When all six of the plows are attached, it turns up a space of a little over seven feet wide. The work was done so well that the trial was successful, even beyond the expectation of the inventor, who was present, and all others who witnessed it. By running at a moderate rate of speed, it will readily plow an acre an hour. This is about the average of the work that has been done by the plow at Bloomsdale. But this is by no means the limit of its capacity. Mr. Williamson had a letter from a party in the West, to whom he had sold one of the machines, in which it was stated that it had plowed as much as three acres of prairie land an hour. The price of the two steamers, respectively, is $4,500 and $5,000. The company present at the trial on Friday, was composed of intelligent men, many of them of large experience in agricultural matters, and others of extensive scientific attainments, and skilled in machinery, and they were united in the opinion that the affair was a grand success. It was concluded that the steam plow is a fixed fact, and that if the invention has not yet reached perfection, it has approached so near it as to warrant the prediction that a great revolution in the culture of the soil is at hand, the importance of which it is impossible to estimate.

After the trial was over, the company returned to the fine mansion of Mr. Landreth, when the hospitalities of the proprietor were dispensed with his usual liberality. The splendid dinner provided for the guests accorded well with the importance of the occasion, which may yet prove an epoch in our agricultural history, of more moment than the most sanguine friends of progress now anticipate. At the close, the plow, the plow-maker, and Messrs. Landreth & Sons, were toasted, and speeches, abounding in wit, pleasantry, and general good feeling, were made by Gen. Patterson, Dr. Emerson, J. I. Smith, of Philadelphia; Prof. Wilkinson, of Baltimore; R. Morris Copeland, of Boston; Mr. Williamson, and others.

Thus ended one of the most interesting and pleasant gatherings in the experience of those who enjoyed it, and one that will be remembered in the future among the most happy recollections of their lives.

[From the "Journal of the Farm," Philadelphia, December, 1872.]

WILLIAMSON'S ROAD AND FIELD STEAMER.

Road and Field Steamer Trial.

The absolute necessity of introducing to general use, or at least for use upon large farms, some motor by which plowing, heavy hauling, Etc., can be done more readily and more cheaply than by horse or mule, or ox power, is beginning to be recognized in this country. In England, the subject has been discussed at length, and the practical results are seen in the use on many English farms, of steam plows. Latterly, road and field steamers have been introduced into the United States, and we had an opportunity of witnessing their operation a few weeks since, at Bloomsdale, on the farm of David Landreth & Son. We are prepared to indorse their strong claims to popular favor.

About two months since, Messrs. Landreth & Son had two of these improved steamers brought to their farm, at Bloomsdale, for the purpose of giving them a thorough, practical trial. After having plowed some fifty acres with them, they were so well satisfied of their value, that a public exhibition of the machine at work was agreed upon, and in company with a number of other invited guests, we were present. The main feature of the engine is the peculiar character of the wheels. This is the invention of Mr. D. D. Williamson, of New York. Lacking space for a minute description of these wheels, we must content ourselves with briefly stating that the rims, or tires, are made of india-rubber, which, being elastic, sufficient adhesion is obtained by the driving-wheels, without damage to the roadway. These elastic tires also act as a perfect spring, and thus save the machine from injury while travelling over rough surfaces. The general construction of the steamer in other respects is like that of ordinary portable engines.

The locomotive power of the steamers was first exhibited

to the visitors. They were shown to be perfectly manageable, whether on an ascent or descent. Two heavy farm wagons, provided with seats, were attached to one of the engines. The seats were filled with a portion of the company, and the train started—passing over hard, as well as yielding ground, rough as well as smooth. Steep embankments were ascended, short curves turned, and after travelling for at least two miles, at a speed of six miles per hour, the starting point was again reached.

The most important part of the exhibition was the plow trial. The ground chosen was a stiff sod, with a deep loose soil below. The plow used consisted of a series of six plows, one of which was taken off. We have not space to describe the construction of the plow, reserving that for another occasion. The plow can be run to any desired depth. It is attached to the engine by a strong chain, and is managed by the fireman, who not only regulates the depth, but operates the apparatus for lifting it—or them, rather—out of the ground at the end of the field. This latter operation is as quickly and easily performed as is the lifting and turning of a single plow, with horses attached. Each plow makes a furrow of a little over a foot in width, the five turning up a space of about six feet. The depth was uniformly seven inches, and when the ordinary horse speed was adopted, the furrows were evenly laid, but the rate was doubled, and then the soil was so thoroughly disintegrated as scarcely to require harrowing. Running at a moderate speed, it will plow an acre an hour, but this speed can be increased at will.

After the very satisfactory exhibition of the capacities of the engines and plow, the company returned to the fine mansion of Mr. Landreth, where they were most hospitably entertained. We regret that want of space compels us to give so brief a description of the pleasant occasion.

[From The "Ledger and Transcript," Philadelphia, Dec. 19, 1872.]

STEAM ROAD WAGONS AND PLOWS.

An esteemed correspondent sends us the following account of the performances of Williamson's Common Road Steamer, for the propulsion of wagons, and for field service on

farms. The exhibition of the steamers was recently given at Mr. D. Landreth's seed farm, Bloomsdale, near Bristol. Our correspondent writes as follows:—"The steamer adapted to common roads, had two farm wagons attached, with twenty-four persons in them. Starting with this train, it passed down a lane, through a gate, took the public road, turned into by-roads, and after a run of two or three miles, at a lively rate, returned to the place from whence it set out. The steamer is quite manageable, under direction of two young men, one the conductor, and the other a fireman. It turned in a very small space, and seemed as easily controlled as a velocipede. Its hauling capacity is from fifteen to twenty tons, and hills of moderate grades are readily passed over. In carrying passengers on a good road, it is claimed that a speed of twelve miles per hour may be made. In plowing, or other heavy work, the speed does not exceed four miles per hour.

"On Mr. Landreth's great seed farm of five hundred acres, without inside fences, and in high culture, about fifty acres had been turned up in an admirable manner, to a depth varying from seven to nine inches. To afford his visitors an opportunity of seeing the machinery work, Mr. Landreth had it turned into a fresh field of stiff clay sod. Through this it went with perfect ease, guided by the young engineer, the fireman setting in the gangs of plows, and raising them at the end of the rows. The turning was accomplished in from thirty to fifty seconds, by a watch. The gang of plows consisted of five each, turning about fourteen inches each, and altogether a width of six feet. A sixth plow can be fixed to the beam, but with five plows nearly an acre an hour can be readily turned, or about eight acres per day, with due allowance for impediment.

"The main principle upon which this steamer depends for its success over all others, is a peculiar construction of its wheels, enabling these, in their rotation, to take a strong hold on the ground, so that nearly all the power of the engine is expended in traction or propulsion. The tires of the wheels are made of elastic rubber, of extraordinary thickness. Upon the circumference steel plates are attached, about a foot long, three-quarters of an inch thick, and an inch apart, making the face of the wheels one foot wide. On coming upon the ground, these broad, elastic wheels, yielding to the pressure upon their rims, take a strong hold. The weight of the engine is so distributed upon the broad wheels that these cause no

greater impact upon the ground than that ordinarily made by the hoofs of horses. The rubber ties operate as springs, and obviate the effects of concussion. These steamers—rated nominally of about eight horse power—with the gang of steel plows, cost about $5,000. A fair estimate of their value must be based upon the amount of work they are capable of doing, and time saved. These machines can be employed not only in breaking up ground, and preparing for crops in little time and in the best manner, but in reaping crops, thrashing the grain, hauling it to market, and doing other things to which steam power is adapted."

[From the "Boston Daily Advertiser."]

PENNSYLVANIA.

The Farms of David Landreth and his Sons.—A New Steam Plow and Traction Engine.—Modern Improvements in Farming.

[FROM AN OCCASIONAL CORRESPONDENT.]

I received recently an invitation to go to Bloomsdale, at Bristol, on the line of the New York and Philadelphia road, the home and farm of David Landreth, the great seed-grower, to witness an exhibition of a new steam plow and traction engine. We have carried the improvement of some kinds of agricultural machinery so far that no great improvement in the method of harvesting crops are likely to be made. Alterations in methods and machines will follow their use, but no radical change is to be expected which can affect the crop of the country. But an improvement in plowing, which will give a man the same control of the preparation of his land that the mower or reaper has over his ripe crop, would be of incalculable advantage. There are two short seasons—one in the fall, the other in the spring—for plowing, and on the good use of these two periods depends the amount of every crop. A few days of rain, or of cold, wet weather, that prevents the hot spring sun evaporating the water from the saturated earth, may reduce the crop very largely. An average team can plow an acre of average land seven inches deep in a day. If a man has a hundred acres to plow and seed, it will take ten teams ten days, and all the chances of weather,

the cost being forty dollars a day at least, or four dollars per acre. If he could plow the land with one machine in ten days, at about two dollars per acre, and do his work better, there would be reason to believe that a man could get rich by farming. Now, better than this can be done. * * *

About twenty-five years ago Mr. David Landreth, the head of the present firm, bought the farm of five hundred acres, which he now occupies at Bristol, having a long river front, permitting all manures and heavy freight to be landed at his wharf, and backed by the canal, and by the railroad. The land was a sandy soil, easy to cultivate, and easily dried after rains, but was wretchedly poor. He and his sons began their work with vigor, and to-day the five hundred acres, the huge barns, seed-rooms, warehouses, lawns decorated with the most beautiful trees and shrubs, the dwelling-house, which was an old farm-house, which has now blossomed out with dormers and gables, and is shaded with broad piazzas, and clad with luxuriant vines, make a picture and *tout ensemble* not equalled anywhere else in this country. These five hundred acres are ever under a crop, and the barns and seed-rooms are filled and emptied five to seven times each year with different seeds. Once harvested, the plants that are full of seed are handled mostly by steam power—are raised and lowered, thrashed and winnowed, dried and carried to their bins by steam power—and are then assorted and packed by nimble-fingered girls and boys, into the little and big packages familiar to our gardeners and farmers. Every crop, when prepared, is divided into two; one-half being sent to the city warehouse, the other remaining on the farm, thus being secured from danger of total loss by fire. Where the grandfather grew pounds of seed, these men grow tons. * * *

They have added to their home farm another, across the river, in New Jersey. They buy all their peas from Northern New York farmers, where, as yet, the weevil has not gone. Their potatoes are grown in New England and New York, and their corn from Canada to Virginia. * * *

At Bloomsdale, all the constructive and repairing work of the farm is done by themselves; they have shops to make and repair their tools, and when one looks at the stacks of tools, droves of plows, the flocks of harrows, the swarms of seed-sowers, drills, and minor instruments of culture, he might think he was in an agricultural warehouse, rather than on a farm. It takes forty horses and mules, and an army of

laborers, to produce and manage all the crops. Hundreds of tons of guano, super-phosphate, bones, blood, offal and night-soil, are landed each year on these farms, coming from all parts of the world, as well as the United States, and side by side you may see the hoofs, blood, and bones, of the Chicago cattle-yard, and the Cincinnati slaughter-house, and guano from the Chincha Island guano beds.

Every toil-worn inventor knows how hard it is to find a good chance to try his machine, especially if a large one, and one which requires the co-operation of other men. Mr. Williamson, the American patentee of the traction engine, learned this to his cost, and tried long and fruitlessly to find a place to experiment in steam plowing, until he met with Mr. Landreth, who was not only ready to believe in and help forward a good invention, but could open fields for steam culture that would fully test the power and value of any machine. I will not consume space describing the machine itself, for that I will refer to the patentee, D. D. Williamson, 32 Broadway, New York. The peculiarity of the engine is that it has a wide band of india-rubber, six inches thick, for the tire of its wheels—one engine has the rubber in a continuous ring, the other in sections; the rubber is faced with a kind of chain armor, which keeps it from contact with, and wear on the earth, but the india-rubber spreads under the weight of the engine, and the face or rim of the wheel seems to open out like the paw of the cat, or the foot of an elephant, and gets great hold on the ground; and although the machine weighs seven tons, its two wheels do not press sod ground more than an inch deep, marking its passage over fallow ground by a path fourteen inches wide, and an inch and a half deep. There is a third wheel, like a velocipede, which turns the engine, and it can turn round and round in its own length, making a perfect circle not more than fifteen feet in diameter. Two wagons, attached to the engine, and loaded with thirty people, started on a tour round Mr. Landreth's farm, sometimes on the road, sometimes in fields, turning the sharpest corners with ease. We were shown fields of ten and twenty acres, plowed with the engine, at a cost of $1 per acre, and ten acres a day. After we returned to the house, the gang plow was attached to the engine, and we started for an old grass field, covered with a strong sod. The plow had six mould boards, or, as it were, six separate plows in one; the machine started at once, and drew the plows up and down the field, over some steep

grades, turning a furrow bed six feet wide, fourteen inch furrows, seven inches deep, and moved as fast as a man could walk. It turned on the headlands in thirty seconds, and whether going up or down hill it could be controlled, regulated, slowed or hastened at will. One of these plows, sold to a western railroad, was put for a first trial into a Minnesota prairie, with an extremely hard, rooty sod, and was driven, as its first test, without stopping, one mile in a straight line, curling over unbroken furrows thirty and forty feet long. The furrows, as they follow the plow, break like the foam crests of waves on the shore.

Thus you see the point I made at the beginning of my story is illustrated at the end—ten acres can be plowed. I have said nothing of the value of the machine for general traction; the same engine can haul a string of wagons to a gravel bank, load them, with a steam shovel, take them out to be dumped, plow, mow, and reap, thrash, drive piles—in short, do all miscellaneous work, and I hope will soon be so improved as to do general housework. R. M. C.

[Stockton (California) "Daily Independant."]

STEAM PLOWING.

Several experiments, all of which have been eminently successful, have at different times been tried with Williamson's Steam Road Wagon, in the vicinity of Stockton; but the first practical test in plowing on a large scale in this county has been made by L. H. Brannock, on his farm on the Cherokee Lane. Mr. Brannock is using one of the steamers regularly, and, with two gangs of four plows each, plows from twenty-five to thirty acres of land daily. The breadth of ground cut by these two gangs of plows is seven feet, and the steamer draws them along steadily and rapidly, without any difficulty whatever. The expense of plowing in this manner is found to be much less than by the ordinary method of using animals. No difficulty whatever is experienced with the steamer on uneven ground. It travels over sudden and sharp elevations, and across abrupt depressions of the land as easily, apparently, and with as little interruption, as are its movements along a

gravelled street or turnpike. One very great advantage which the steamer possesses over teams of horses or oxen is, that in clearing land the steamer can readily be detached from the plows, and fastened to a newly felled tree, which is bodily removed by the machine to any desired part of the field. In work of this kind the wonderful power of the steamer is shown even better than in plowing. It will haul off a large oak tree, trunk and branches together, with as little apparent difficulty as it would travel with a brush harrow. We are told that Mr. Brannock, after having given the steamer a more extended and thorough trial than it has heretofore had in this section of the State, is well satisfied with its working power, and its adaptability to the heavy labor necessary to be done on a well managed farm.

At the California State Fair, held at Sacramento, a prize of $50 and diploma were awarded to the Williamson Steam Plow.

[Stockton (California) "Daily Independant."]

WILLIAMSON'S ROAD WAGON.

This locomotive, for use on common roads, and on exhibition, under the charge of Mr. Barnaby, in this city, hauled five wagons, loaded with gravel, from Mr. Overhiser's farm yesterday. Mr. Overhiser tells us that the gravel hauled into Stockton by the locomotive, or steam wagon, at one trip, weighed not less than thirty tons. He believes that it can haul sixty tons. An exhibition of its power in plowing will be given on the land of Hiram Fisher, on the east side of the city, at 2 o'clock next Saturday afternoon.

[*Extract from letter from Messrs. Campbell & Turton, Sugar Planters, Laphania Maui, Hawaiian Islands.*]

"The Williamson Road Engine, ordered by us through our agents, has arrived safely, and been carefully set up. We have tried the machine, and find it works beautifully, and

believe that it will do all that is required of it. We are much pleased with it. On good roads it will be invaluable as a substitute for cattle, as in this warm climate cattle will not stand the work. We hope you will have more orders from our far-off Isles."

To D. D. WILLIAMSON, Esq., New York.

[*Extract from a letter from Clark W. Thompson, Esq., President of the Minnesota Southern Railroad, dated Wells, Minnesota, October 7th, 1872, ordering a duplicate part to replace a piece broken in his Williamson Steamer.*]

"Please have us a duplicate made as soon as possible. It is getting late in the season, and I have three thousand acres to plow yet, *and we are losing thirty acres every ten hours.* We will have to run her day and night."

The breaking plow used by Col. Thompson on his thirteen thousand acre farm, consists of five twenty-inch plows, attached to a triangular frame, with arrangements for lifting and regulating the depth of the plows. Each plow is separate, and can be taken out to be sharpened, which is absolutely necessary in breaking virgin prairie. At the first trial, the steamer drew this gang, plowing one hundred inches wide, and four inches deep, in a straight line, for a distance of one mile and back, accomplishing the two miles in thirty-four minutes, the area plowed being a trifle over two acres.

AT THE GREAT FAIR IN ST. LOUIS, MO., in 1871, the diploma was awarded to the Williamson Road Steamer and Steam Plow, "for the most important invention relating to agriculture, patented within three years."

This diploma had not been awarded for three years, as nothing exhibited had been considered worthy of this special honor. The plowing done was one hundred inches wide, and four and a half inches deep, and the speed three miles per hour. The road test was with a train of four wagons, loaded with one hundred and forty men, and the speed was nine miles per hour.

AT THE SAVANNAH, GA., FAIR, the large gold medal was awarded to the Williamson Road Steamer, (owned by the Georgia Central Railroad.) The steamer had been employed hauling loads, consisting of six logs in trucks, and doing the work of twenty-four mules, on deep sandy roads.

MR. JOHN YOUNG, OF SALT LAKE, UTAH, writes: "I am perfectly satisfied with my road steamer. I consider the load she has been hauling equal to thirty tons on good wagons."

This steamer is now employed hauling silver ores over the mountains in Utah.

REPORT OF THE COMMITTEE

OF THE

WILMINGTON (NORTH CAROLINA) FAIR, 1871,

AWARDING THE GOLD MEDAL TO THE

WILLIAMSON ROAD STEAMER.

THE undersigned committee, to whom was referred the above named machine, for a full report upon its merits and defects, respectfully report:

A full test of its capacity was made on the grounds of the Association, around the race track, and for about three-fourths of a mile to and fro over the country road, across one "branch," and out of the road into the pine woods, up a declivity of about one in five, and back again into the fair grounds.

The race track is built of a surface of clay about two inches thick, upon a bed of sand; a load attached to the steamer, composed of a ten-horse engine, on wheels, and four ordinary road wagons, loaded with people, which proved too much, on account, as we believe, of the softness of the track, and the *narrow tires* of the wagon wheels. With the engine above referred to (weight about six tons), the steamer moved readily around the track, and afterwards drew the four wagons, with full load of people, easily.

We understand the proprietors claim that on roads in ordinary good condition, that the steamer will draw in the wagons, with broad tread wheels adapted to the work, twelve tons dead weight. We believe that this machine will come fully up to the claim.

We further believe that in charge of *competent mechanics*, these steamers will be useful and economical, as feeders to the railroads in this section of the State, and as a good *substitute* for railroads, where there is difficulty in procuring capital for the construction of the latter.

Without load on the race track, the steamer moved around, one-half mile in one minute and forty-eight seconds, or *about* seventeen miles to the hour.

The boiler works well, furnishing all steam necessary for the heaviest work.

With full loaded train, the speed will be eight miles an hour, on level road in good order. The road is *improved* by the steamer passing over it.

In conclusion, we think the steamer capable of doing all that is claimed for it.

Water tanks are attached, with capacity to furnish water for six miles run; and bunkers for coal sufficient for half day's run. Competent engineer and fireman are all the labor required for a full train.

The steamer is well adapted for drawing a gang of five twenty inch plows (or seven twelve inch), and we think will do well in this respect.

Arrangements are provided for using the power of the engines for driving cotton gins, thrashing machines, or other farming implements requiring steam or horse power.

In consideration of the great success of this machine, and its eminent adaptability to work required in this section of the country, the committee recommend an award of the highest premium of the Association—the Gold Medal of the Association.

JNO. C. BAILEY,
C. S. SERVOSS,
J. F. FINGER,
JOHN BISSET,
WM. L. DEROSSET,
ARCH. PAE,
JOHN COLVILLE,
H. J. RISLEY,
S. W. SKINNER.

[FROM THE "ALBANY ARGUS," JULY 18, 1872.]

STEAM TOWING ON CANALS.

THE practicability of using steam as a means of towage on our canals, seemed to be fully demonstrated yesterday afternoon, on the section of the canal between lock No. 1 and the arsenal. The motive power used on the occasion was one of Williamson's Road Steamers, under the personal supervision of the patentee, Mr. D. D. Williamson, of New York.

In order to give a correct idea of the working of this road steamer, it will be necessary briefly to describe its working parts. The boiler is fixed on the cross piece of a **T** shaped frame, which is mounted on three rough iron wheels, having a band of india-rubber around them, four and a half inches thick, by twelve inches broad. The front, or steering wheel, is three feet in diameter, with a twelve inch face, and the side wheel five feet in diameter, with fifteen inch face. The india-rubber band, or face, on the wheels, is protected by a series of steel shields, one inch and a half apart, fastened together by an endless chain, which imbed themselves in the india-rubber facing, as the wheel passes over the ground. The propelling power is obtained from an engine, consisting of two cylinders ten inches long, and six inches in diameter, which, by means of gear work, turn the side wheels either backward or forward, at the pleasure of the engineer, who sits in front of the boiler, having immediately in front of him the steering apparatus on his right, and on his left a series of levers for starting the engine, or throwing the wheels out of gear. The entire weight of the machine is about six tons, and by a simple contrivance the power of the engine is trebled, so as to enable it to ascend the steepest grades, and the rubber tires on the wheels, in addition to giving them the most perfect adhesion, act as veritable road rollers, rolling the tow path smooth, and keeping it in good repair. The pressure of steam required to enable the engine to draw three barges, is one hundred pounds to the square inch, and that pressure can be kept up with a consumption of one hundred and fifty pounds of coal per hour.

At a preliminary trial on Tuesday, the steamer towed three barges (two loaded and one empty), the first mile in thirteen minutes; the second in fifteen minutes, and the third in seventeen minutes; it was also proved that the steepest grade could be ascended and descended with the greatest ease; that the engine could turn in its own length, and was under perfect control.

The trial before the canal commissioners, however, took place yesterday, when the following commissioners were present: Messrs. Wright, Fay, and Barclay; also, a deputation from the board of trade of this city, Superintendent North, and others.

At the appointed time, the engine ascended the incline from the Troy road to the tow path, and hitched on to one of three bull-head barges, which were standing loaded with lumber, south of the arsenal, and having moved it into position, adopted the same course with the second and third, until they were arranged as a tow, and properly secured. A rope from the engine having been made fast to the foremost boat, the engine started, and drew them with the greatest ease, at the rate of three and a half miles an hour, to the lock just above the city, where she turned round, and having made fast to another loaded barge, going north, took that in tow with the same result.

The greatest satisfaction was expressed by all present at the successful working of the steamer, and it must not be forgotten that it does its work without any change whatever being made either in the canal or boats.

The following is an estimate of the comparative expense of towing three first class boats from Albany to Buffalo in six days,

By the Williamson Road Steamer.

12 tons of coal, at $6 per ton	$72 00
2 engineers (12 days), at $2.50 per day	30 00
2 firemen (12 days), at $1.50 per day	18 00
Oil and grease, at 50 cents per day	3 00
Repairs, at $1 per day	6 00
Interest on $5,000, at 7 per cent for 7 months	10 00
Depreciation on $5,000, at 10 per cent. for 7 months	14 00
Towing 3 boats,	$153 29

Towing 1 boat,		$51 10
To make the comparison with horse towage and expenses of crew, etc., for 6 days, at $12.03 per day, add	$72 18	
Interest on cargo for 6 days, at 96 cents per day,	5 76	77 94
Cost of transportation by 1 boat by road steamer in 6 days		129 04
Cost of transportation by 1 boat by animal power in 10 days		262 90
Saving per boat by use of road steamer, 4 days and		$133 86

By the Belgian System.

The company estimate a tug to burn 2 tons of coal per day, and to make the trip in six days, at a running expense of $40 per day	$240 00
Add interest at 7 per cent., and depreciation 10 per cent on cable and tugs for 6 days, per tug	121 42
	$361 42
Cost of running road steamer,	$153 29
Saving of road steamer over cable towage	$208 13

By Propellor.

From the official report of the trips of the Dawson, it is evident that no economy was shown over animal towage, when taking into consideration the diminished cargo capacity of the steamboat.

[*Extract from a letter of D. M. Green, C. E., of Troy (the engineer appointed by the Canal Award Commissioners to examine all steamboats competing for the* $100,000 *prize), written after carefully examining the operation of a Williamson Road Steamer, on the Erie Canal, and estimating the cost of running, etc.*]

"I have no doubt you will be able to tow *three* loaded boats, at a speed of *three miles* per hour, at *one-half* the present expense of horse towage."

[From the "Albany Argus," August 2, 1872.]

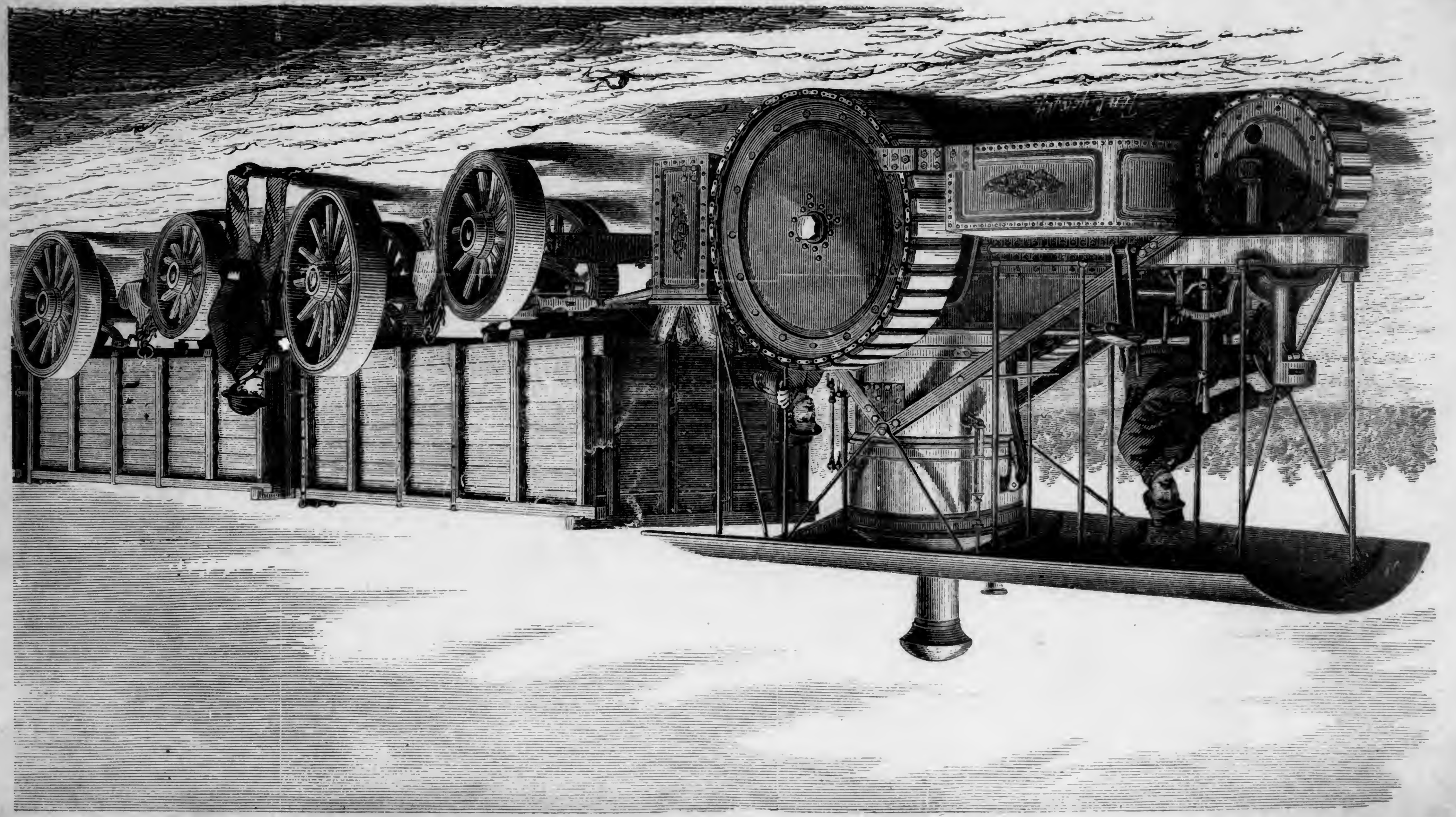
CANAL TOWAGE.

Mr. O. F. Potter, of West Troy, has written the following letter to Mr. D. D. Williamson:

"Dear Sir: I was present and witnessed the several experi-

ments with your road steamer upon the canal between Albany and Troy. After carefully observing the several trials, I am fully convinced that the principle of towing from the bank is the most practical and effectual mode as yet proposed for quickening and cheapening transportation upon our canals. It leaves the navigator at liberty to patronize this mode or refuse it, just as he pleases.

"I cannot see any objections to it being applied to towing purposes at once, which can be done by gradual application at different points on the canal. Its strange appearance and noise of steam is nothing more than the circumstance of applying steam, which of necessity has had to be overcome on different occasions, for the last forty years."



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